Minimum One Year Outcomes for Open Surgical Treatment of Extra-articular Femoroacetabular Impingement

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Financial Disclosure

Benjamin F Ricciardi, M.D.

No financial interests, arrangements or affiliations that could be perceived as a real or apparent “conflict of interest” in the context of my participation in this presentation.
Introduction

• Extra-articular impingement results from abnormal contact between the extra-articular regions of the proximal femur (greater trochanter, lesser trochanter, extracapsular femoral neck) and the ilium or ischium.

• This may result in pain due to direct compression of soft tissue structures or indirect damage to labral and articular cartilage.

• Clinical outcomes for treatment of extra-articular impingement are limited.

• Existing studies focus primarily on patients with sequelae of pediatric hip disease (Legg-Calve-Perthes, Slipped Capital Epiphysis).
Aims

1. To describe pre- and post-operative functional outcome scores in patients undergoing open hip preservation surgery for extra-articular impingement.

2. To identify any associated factors for reoperation or failure to improve postoperatively within this cohort.
Methods

• Retrospective review of prospective data over a 44 month period. (3/10-11/13)

• Presumptive diagnosis of extra-articular impingement:
  – Lateral or posterior pain on history
  – Poor external rotation
  – Poor internal rotation without significant cam lesion
  – Positive posterior impingement sign
  – Poor pain relief to intra-articular injection
  – Presented at consensus indications conference to determine optimal approach

• The diagnosis was confirmed intra-operatively by contact between the extra-articular femur (greater trochanter, extra-capsular femoral neck) on ischium or ilium within a physiologic range of motion.

• Exclusion criteria:
  – Less than 1 year of patient reported outcomes follow up from FINAL surgery (including bilateral surgery).
  – Extra-articular impingement treated with arthroscopic approach alone.
Methods

• **Demographic variables:**
  – Age, sex, laterality, previous hip surgery

• **Clinical parameters:**
  – Range of motion, provocative testing

• **Radiographic parameters:**
  – CT: acetabular version, femoral version, neck-shaft angle, alpha angle
  – MRI: labral integrity
  – Xray: tonnis grade and lateral center edge angle

• **Functional outcome scores**
  – Modified Harris Hip Score (HHS), Hip Outcome Score (HOS), International Hip Outcome Tool (iHOT-33)
Methods

• **Primary Outcomes**

1. *Failure to improve from baseline at minimum 1 year*
   - Defined as:
     - < 10 point improvement in iHOT-33 from baseline
     - *iHOT-33 displays less ceiling effect in younger, active populations undergoing hip arthroscopy for FAI [2].*
   - OR

2. *Reoperation other than elective hardware removal*
Results: Demographics

- 51 patients (62 hips)
- Males: 8 (16%) Females: 43 (84%)
- Mean age: 25 years (range 15-43)
- Unilateral: 40 (78%) Bilateral: 11 (22%)
- Previous Hip Surgery: 21 (41%)
- Previous Hip Disease
  - Legg-Calve-Perthes (5 patients)
  - Ehlers Danlos (1 patient)
  - DDH (1 patient)
  - SCFE (1 patient)
Results: Intraoperative Procedures

• Trochanteric Procedures Performed
  – Anterior trochanteric osteoplasty (22 cases)
  – Posterior trochanteric osteoplasty (9 cases)
  – Combined anterior/posterior trochanteric osteoplasty (13 cases)
  – Relative neck lengthening (12 cases)

• Intra-Articular Procedures Performed
  – Osteochondroplasty (47 cases)
  – Rim resection (16 cases)
  – Labral repair (19 cases)
  – Labral Reconstruction (2 cases)
# Results: PROMs

## Overall Patient Reported Outcomes

<table>
<thead>
<tr>
<th>Outcome Scores</th>
<th>Preoperative Score</th>
<th>Postoperative Score at Last Follow Up</th>
<th>% Improved by MIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>mHHS</td>
<td>53 (14)</td>
<td>75 (17)</td>
<td>79%</td>
</tr>
<tr>
<td>HOS ADL</td>
<td>64 (20)</td>
<td>83 (18)</td>
<td>75%</td>
</tr>
<tr>
<td>HOSSport</td>
<td>46 (27)</td>
<td>66 (28)</td>
<td>60%</td>
</tr>
<tr>
<td>iHOT-33</td>
<td>31 (17)</td>
<td>62 (26)</td>
<td>76%</td>
</tr>
</tbody>
</table>

Mean follow up 23 months (range 11-54)

Continued improvement out to 2 years (N = 16 at 2 years from final surgery)
Results: Reoperations/Failures

- **Reoperations (N=7 hips)**
  - Arthroscopy (4)
    - Lysis of adhesions with/without ROH
  - PAO (2)
    - Residual dysplasia, Instability (Ehlers Danlos)
  - Open gluteus medius repair (1)
    - Gluteus medius tear, HO removal, sciatic nerve neurolysis

- **Failure to improve at last follow up on iHOT (N=8 patients)**
Results: Associated Factors

• HOS Sport: Higher preoperatively in Failures (58 [SD 19] versus Improved (40 [SD 27]) (p=0.03).

• No other associated factors:

  • Age
  • Sex
  • Unilateral v Bilateral
  • Previous Hip Surgery
  • Lateral CEA
  • Acetabular Version
  • Femoral Version
  • Alpha Angle
  • Neck-Shaft Angle
  • Tonnis grade
  • Labral Integrity
  • Preoperative ROM
  • Preoperative PROMs
  • Pattern of EXT impingement
Discussion

- Patients undergoing open hip preservation surgery for extra-articular impingement have improvements in PROMs at min. 1 year follow up (approx 75% of cases).

- Continued improvements seen at 2 years follow up in subset of patients reaching this timepoint since last hip surgery.

- No factors examined in this study were associated with poor outcomes (preoperative HOS Sport ?clinical significance).

References
